Katie Pennicott's lucid account in the March issue of *Physics World* of the beautiful preliminary results from the muon g-2 experiment now in progress at Brookhaven[1] unfortunately obscures the significance of that experiment. While there is a possibility, as Vernon Hughes and John Ellis suggest, that the experiment may eventually provide evidence for "new physics" such as supersymmetry, that evidence must, in my opinion, await better theoretical understanding of the muon magnetic moment, as Ynduráin has already pointed out[2]. The precision of the experimentalmeasurement, in other words, challenges our ability to calculate the expected result of that measurement.

The uncertainty of the Brookhaven g-2 measurement is now about 1.5 in units of $10^{10}\frac{g-2}{2}$ (1.3 parts per million), with 1 year of data yet to be analyzed according to reference 2.. Weak and electromagnetic contributions to g-2 can be calculated according to a well-understood theory with about 1/30'th of the uncertainty of the measurement, as is noted in the reference. The difference between that calculation and the measurement is 71.8 with the uncertainty of the experimental result. That difference is ascribed to hadronic effects. Accordingly, the true significance of the new result is that it measures the hadronic contribution to the muon g-2 with a precision of the order o 1%. That precision may increase appreciably when the Brookhaven group completes its analysis.

Yndurán, in reference 2, invites our attention to 4 different published estimates of the hadronic contribution ranging from 69.2 to 72.5, each with a quoted uncertainty of the order of a percent. The "theoretical prediction" used by the authors of reference 1 uses only the lowest estimate, leading to an apparent discrepancy between theory and experiment of about 2.6σ. A different choice of estimate would have indicated that theory and experiment were in agreement, within the quoted uncertainties.

The Brookhaven experiment, when it is completed, threatens to challenge our understanding of the hadronic contribution to g-2 at a level approaching 1 part in 1000. There is no theory of hadrons that predicts cross sections with such precision. Such theory should presumably grounded in quantum chromodynamics (QCD), which does not yet lend itself to such predictions of that accuracy.

There is a phenomenology that relates the hadronic contribution to g-2 to other experiments and provides the basis for current estimates. Whether this phenomenology is completely consistent with QCD is still an open question. Deviation between QCD predictions and phenomenology would provide one kind of evidence for new physics. Deviation between an unambiguous prediction from phenomenology and the new measurement of the hadronic contribution to g-2 would provide another kind of evidence for new physics. It is clear that we have no such unambiguous prediction at present.

Given the present state of our understanding of hadronic physics, a disagreement of the order of a few percent between experiment and the present estimates of the hadronic contribution to g-2 is not in my opinion a basis for claiming a disagreement between standard physics and experiment. In the words of the author of reference 2, "To advertise evidence for SUSY or any other kind of *nonstandard physics* on such a basis is, to put things in as mild a way as possible, misleading".

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[1] Brown, H. *et al.* Phys.Rev.Lett.86:2227-2231,2001

[2] Ynduráin http//xxx.lanl.gov/abs/ hep-ph/0102312

sions. Jack Uretsky